V. Conclusions and Future Research

Conclusions

Several analyses related to unemployment among individuals with doctoral degrees in science and engineering were presented in this report. Unemployment was relatively high in this population in 1993 compared to earlier years; however, the ratio between unemployment among doctoral scientists and engineers and total population unemployment in 1993 was essentially unchanged.

Neither gender nor race/ethnicity had a statistically significant association with unemployment in 1993. A hearing or mobility disability or advanced age, however, appeared to increase the probability of being unemployed.

The association between gender and unemployment was much stronger in 1973 than in 1993. In contrast, the association between age and unemployment was stronger in 1993 than in 1973.

Unemployment in the Larger Career Context

Unemployment is not merely an economic phenomenon, from the individual's perspective, but one of many career possibilities at a particular point in time. Individuals unable to obtain the type of employment they consider desirable may settle for a job that has serious drawbacks. For example, a part-time job may be accepted when a full-time job is preferred, or a position in a field other than that of the doctoral field may be accepted when an in-field position is preferred. It is reasonable to expect that the unemployment rate will not only reflect how difficult it is to obtain suitable employment, but will also reflect differences in individuals' preferences and the availability of less desirable opportunities for employment. A factor associated with an above average level of unemployment is, therefore, not necessarily associated with other adverse career outcomes.

For example, in 1993, those who had degrees in psychology had a below average unemployment rate relative to other doctoral scientists and engineers, but an above average involuntary part-time employment rate. One plausible explanation for this discrepancy is the greater opportunities for self-employment in psychology than in other doctoral science and engineering fields. Over a quarter of individuals in the labor force with doctoral degrees in psychology reported they were self-employed in April 1993, compared to a range of 3 to 8 percent for other degree fields examined. Thus, individuals with psychology degrees who have difficulty obtaining full-time employment presumably have greater opportunities for part-time self-employment. This hypothesis is further supported by the fact that the involuntary part-time rate for those who are self-employed is relatively high—3.8 percent—compared to 1.0 percent for individuals not self-employed.

Although a full exploration of these alternative measures is beyond the scope of this report, the observed unemployment, involuntary part-time employment, and involuntary out-of-field rates are presented in table A-1. Examination of the associations between unemployment, involuntary part-time employment, and involuntary out-of-field employment across all subgroups examined in this study indicated that there were weak, but positive, associations between these different indicators of stress in the labor market ($r = .35$ for the associations between unemployment and involuntary part-time employment and between unemployment and involuntary out-of-field employment, and $r = .13$ between involuntary part-time and involuntary out-of-field employment).

In sum, although the information in this report is of interest to individuals planning their careers, it should not be interpreted as a complete picture of potential career outcomes.

Educational decisions, such as the age at receipt of degree and degree field, were associated with unemployment. Obtaining a Ph.D. at a relatively young age was associated with low unemployment. Although there were differences among degree fields, the association between degree field and unemployment was not very strong. Further, the fields that had above or below average rates in 1973 were different from those in 1993.

Interruptions in a full-time career subsequent to receipt of a doctorate are associated with above average unemployment rates. Employment sector, occupation, and geographic location also influenced the probability of current unemployment. The impact of sector and place of employment/residence on unemployment appears to remain stable over time.

It is important to note that unemployment is only one possible career outcome (see box, Unemployment in the Larger Career Context). Other indicators of labor market stress available from the 1993 SDR include the involuntary part-time employment rate and the involuntary out-of-field rate. Groups within the doctoral population with relatively high unemployment rates also tend to have high rates of involuntary part-time employment and involuntary out-of-field employment, though the associations are weak.

Future Research

Additional analytical work suggested by this study includes the following:

- Future work on the correlates of unemployment should ideally include additional variables. Variables found to be related to unemployment in the 1972 NSF study, but not included in the 1993 SDR, were previous work activities[35] and whether Federal support was received for prior work.[36] Additional information about doctoral and other degrees (for example, information about the institutions granting the degrees) and the length of time to complete degrees, information on work history and work skills, and postdoctoral training/employment should also be incorporated. The 1995 SDR that recently became available for analysis contains several interesting new variables that could be used.

- Parallel analyses could be conducted for other aspects of doctoral careers, such as salary level, voluntary and involuntary part-time employment, voluntary and involuntary employment outside degree field, and employment in unsuitable positions. These parallel analyses would place Ph.D. unemployment issues in a broader context.

[35] NSF 1972, p. 22 and 71.
[36] NSF 1972, pp. 24 and 40.